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I, JANENE PEISKER, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Complete specification in connection with Application No. 2003268602 for a patent by EZI AUTOMATION PTY LTD as filed on 11 December 2003.

WITNESS my hand this  
Twenty-fourth day of December 2004

JANENE PEISKER  
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## HIGH IMPACT GATE

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This invention relates to a security gate. It is particularly related to a high impact gate able to withstand significant direct impact and maintain a secure location by prevention of access by vehicle or foot.

10 Barriers of all types are used throughout the world to prevent intrusion into restricted areas or retain personnel or goods within restricted areas. Intruders include unwanted personnel, animals, vehicles, and the weather. At times personnel and goods must enter or leave restricted areas, resulting in the requirement for at least part of the barrier to be movable. Movable barriers, such as gates, doors, and movable portions  
15 of walls, allow passage out of and into restricted areas.

In US Patent No 4,828,424 there is shown a vehicle security barrier (10) for selectively prohibiting a vehicle from accessing a preselected area and for otherwise controlling vehicular traffic. The security barrier (10) comprises a base (12) defining a travelway (14) over which a vehicle can be driven. The base (12) comprises a forward end portion defining an entryway (20) whereby a vehicle enters onto the travelway (14) and a rearward end portion defining a travelway exit (22) whereby a vehicle exits the travelway (14). The security barrier (10) further comprises a security gate (18) pivotally mounted on the base (12) for being selectively raised to obstruct the travelway (14) and prohibit a vehicle from exiting the travelway via the travelway exit (22). Reciprocal actuating means are also provided for selectively raising and lowering the gate (18). In the preferred embodiment, the reciprocal actuating means comprises a first and second fluid actuated cylinder (64A and B). In another embodiment, sacrificial gate support means (160) are provided for absorbing the energy of a speeding vehicle, thereby minimizing structural damage caused by the impact of such a vehicle.

However this patent only discloses the need for a collapsible structure in order to perform the impact security system. The system does not allow ready opening or high  
35 security.

US Patent No 5,624,203 describes a restraining barrier (30) which is positionable across a roadway in a deployed position to define a restraining zone and may be moved vertically to a passive position by first and second transport members (13, 14) 5 slideably mounted to first and second towers (3, 4) on either side of the roadway. The barrier may be a rectangular net. First and second cables (34, 35) each support an opposite end of the barrier to the said first and second transport means respectively and also couple the barrier to an energy absorber (known per se). The cable includes a support cable which also responds to the impact of a vehicle as by breaking. The 10 cable is coupled to an operate indicator for producing a signal indicating the vehicle impact.

Clearly such a structure must be lightweight in order to allow the ready lifting or require a substantial movement mechanism if heavy duty structures are to be used. 15 Such a system therefore is not practical for high impact security systems.

In US 5,823,705 there is disclosed a restraining barrier that is positionable across a roadway in a deployed position to define a restraining zone and may be moved vertically to a passive position by first and second transport components. Opposite 20 ends of the barrier are coupled to the first and second transport components, respectively, and also couple the barrier to first and second energy absorbers of differing restraintive force in order stop vehicles of varying weight. A support cable is coupled to an indicator for providing a signal indicating vehicle impact. Additionally, a series of restraining barriers and energy absorbers may provide a 25 series of sequentially differing restraintive forces to stop lightweight and heavier vehicles. The barrier may be a net and include a lower wire below the net assuring effective trapping of autos and trucks of a variety of heights.

However such a structure is not acting as a security system as it readily allows smaller 30 articles such as people to gain access to the restricted area. Further such net restraint systems do not provide a visual barrier that looks substantial and has a deterrent value.

It is an object of the invention to provide a high impact gate that is readily movable but provides high security.

It is also an object of the invention to provide a high impact gate that overcomes or  
5 at least ameliorates the problems of the prior art.

In accordance with the invention there is provided a high impact gate including a lower section sized to take the impact of a vehicle, the lower section formed by two spaced linear structures joined by cross bracing to form a high impact barrier. The  
10 spaced linear structures can be "I" beams and the bracing can be cross diagonal bracing.

The spaced linear structures extend substantially horizontally with the diagonal bracing being in a vertical cross section. Preferably the cross bracing extends  
15 between internal vertices of a vertical cross section of the spaced linear structures to provide bracing in at least two directions.

The lower section of the high impact gate can include a first end part mounted on a sliding mechanism and allowing the distal second end to be cantilevered such that the  
20 second end can extend at least partially over a roadway to prevent unauthorized entry and the sliding mechanism allows sliding out of the way for authorised entry along the roadway.

The sliding mechanism can include one or more ground engaging rollers mounted on  
25 a reinforced base adjacent to the roadway.

Also there is provided a high impact gate including a lower section and an upper section mounted on the lower section, the lower section sized to take the impact of a vehicle and the upper section providing a vertical barrier, the lower section formed by  
30 a boxed structure having two spaced linear structures joined by cross diagonal bracing to form a high impact barrier. The spaced linear structures having "I" beams and extending substantially horizontally with the diagonal bracing being in a vertical cross section. The lower section can include a first end part mounted on a sliding

mechanism and allowing the distal second end to be cantilevered such that the second end can extend at least partially over a roadway to prevent unauthorized entry and the sliding mechanism allows sliding out of the way for authorised entry along the roadway. The sliding mechanism preferably includes one or more ground engaging

5      rollers mounted on a reinforced base adjacent to the roadway.

The invention provides a method of mounting a high impact gate, the method including providing a gate including a lower section sized to take the impact of a vehicle, the lower section formed by two spaced linear structures joined by cross bracing to form a high impact barrier; providing two sets of buttresses on either side of a roadway upon which high security authorized access is required; mounting the gate on a sliding mechanism extending between the two sets of buttresses such that the buttresses provide a strengthening aid for the high impact gate when the lower section is struck and the buttresses provide a linear control of the sliding mechanism.

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15      The buttresses can be mounted to solid weighted bases with the buttresses having an outwardly angled supporting structure having a base portion further from the lower section than a top portion to provide the supporting structure while also providing a deflection mechanism to the impact of a motor vehicle.

20      In order that the invention can be more readily understood an embodiment will be described by way of illustration only with reference to the drawings wherein:

Figure 1 is a perspective view of a high impact gate in accordance with a first embodiment of the invention;

25      Figure 2 is a front elevation of the high impact gate of Figure 1 from the unsecured side;

• Figure 3 is an overhead plan elevation of the high impact gate of Figure 1;

Figure 4 is a partial vertical cross section of the lower section of the high impact gate of Figure 1; and

30      Figure 5 is a vertical cross section of the upper section, lower section and base of the high impact gate of Figure 1.

Referring to the drawings, there is shown a high impact gate including a lower section and an upper section mounted on the lower section.

The lower section is formed by a boxed structure having two spaced linear structures

5 joined by cross diagonal bracing to form a high impact barrier. The size of the box structure is primarily an elongated box like structure which extends close to the ground across the roadway to be protected. The heavy structure is sufficient to take the impact of a vehicle.

10 The upper section provides a vertical barrier and includes an upright, rigid, rectangular frame having spaced vertical bars. The vertical bars are spaced sufficiently close to each other so as to prevent access to a person passing through the upper section. The upper section is of such a height that it is not readily climbed. In addition, there are no cross-members that can serve as foot-holds to aid climbing.

15 The invention therefore provides a cantilevered style high impact gate leaf weighing about 1.6 tons and comprising of two "I" beams braced and designed to withstand the impact of a 4 ton truck at 30 kilometres per hour. This can be scaled up to for example, impact from a 10 ton truck at 80 kilometres per hour. The bracing of the 20 twin "I" beams with a cutting edge facing the unsafe side of the gate is a novel design and capable of not only destroying a vehicle on impact but also not yielding as a result of a collision. The principle of this cantilever gate is a gate leaf supported by a front roller and protected in a buttress and connected to a rear track via a roller trolley. The twin "I" beams are held in a cantilevered position the roller trolley, which is held 25 under an inverted "L"-shaped track that is mounted rigidly in an elongated base. By this arrangement, the gate pivots around a fixed base roller.

30 The gate is powered by a three phase 4 kilowatt brake motor and is capable of opening and closing speeds of about 1 metre per second. The motor and electronics are housed within one of a pair of angled steel buttresses from which the motor drives the gate leaf via a steel rack. When the gate leaf is in the closed position, the end section of the gate leaf is located in the other of the set of buttresses on the other side of the roadway so as to withstand high impact. The buttresses are arranged so that at

least the lower section of the gate is snugly fitting within the sets of buttresses to allow the sliding motion of the gate as it opens and closes; but also to assist in providing high impact support to the overall gate structure.

5 Both sets of gate buttresses and the back rail of the gate system are bolted onto a solid concrete weighted base. The concrete base is sufficiently engineered to provide solid support to the gate mechanism and the two sets of buttresses and absorb vehicle impact.

10 Whilst the gate mechanism is designed to open and close in a sliding manner via switches and electrical control signals sent via access control systems, the system is novel in the manner in which it provides safety to both vehicles and pedestrians. The safety devices includes flashing lights, audible warning buzzer, two inductive loops for detection of vehicles and two photoelectric beams for detection of pedestrians.

15 It can therefore be seen that the gate system provides an improved structure that can withstand high impact by a vehicle. This is provided in the preferred embodiment by the use of "I" beams and the engineering of the diagonal internal bracing which is unique.

20 It should be understood that the above description is of a preferred embodiment and provided by way of illustration only. Clearly a person skilled in the art would understand variations to the invention without any inventive element and such are included within the scope of the invention as defined in the following claims.

The claims defining the invention are as follows:

1. A high impact gate including a lower section sized to take the impact of a vehicle, the lower section formed by two spaced linear structures joined by cross bracing to form a high impact barrier.

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2. The high impact gate of claim 1 wherein the bracing is cross diagonal bracing.

3. The high impact gate of claim 1 or 2 wherein the spaced linear structures are "I" beams.

10

4. The high impact gate of claim 1, 2 or 3 wherein the spaced linear structures extend substantially horizontally with the diagonal bracing being in a vertical cross section.

15 5. The high impact gate of any one of the preceding claims wherein the cross bracing extends between internal vertices of a vertical cross section of the spaced linear structures to provide bracing in at least two directions.

20 6. The high impact gate of any one of the preceding claims wherein the lower section includes a first end part mounted on a sliding mechanism and allowing the distal second end to be cantilevered such that the second end can extend at least partially over a roadway to prevent unauthorized entry and the sliding mechanism allows sliding out of the way for authorised entry along the roadway.

25 7. The high impact gate of claim 6 wherein the sliding mechanism includes one or more ground engaging rollers.

8. The high impact gate of claim 6 or 7 wherein the sliding mechanism is mounted on a reinforced base adjacent to the roadway.

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9. A high impact gate including a lower section and an upper section mounted on the lower section, the lower section sized to take the impact of a vehicle and the upper section providing a vertical barrier, the lower section formed by a boxed structure

having two spaced linear structures joined by cross diagonal bracing to form a high impact barrier.

10. The high impact gate of claim 9 wherein the spaced linear structures are "I" beams and extend substantially horizontally with the diagonal bracing being in a

5 vertical cross section.

11. The high impact gate of claim 9 or 10 wherein the lower section includes a

10 first end part mounted on a sliding mechanism and allowing the distal second end to

be cantilevered such that the second end can extend at least partially over a roadway to prevent unauthorized entry and the sliding mechanism allows sliding out of the way for authorised entry along the roadway.

12. The high impact gate of claim 11 wherein the sliding mechanism includes one

15 or more ground engaging rollers.

13. The high impact gate of claim 11 or 12 wherein the sliding mechanism is

mounted on a reinforced base adjacent to the roadway.

20 14. A method of mounting a high impact gate, the method including

a) providing a gate including a lower section sized to take the impact of a vehicle, the lower section formed by two spaced linear structures joined by cross bracing to form a high impact barrier;

b) providing two sets of buttresses on either side of a roadway upon which high security authorized access is required;

25 c) mounting the gate on a sliding mechanism extending between the two sets of buttresses such that the buttresses provide a strengthening aid for the high impact gate when the lower section is struck and the buttresses provide a linear control of the sliding mechanism.

30

15. A method of mounting a high impact gate in accordance with claim 14 wherein the buttresses are mounted to solid weighted bases.

16. A method of mounting a high impact gate accordance with claim 14 or 15 wherein the buttresses have an outwardly angled supporting structure having a base portion further from the lower section than a top portion to provide the supporting structure while also providing a deflection mechanism top impact vehicles.

5

17. A high impact gate substantially as hereinbefore described with reference to the drawings.

18. A method of mounting a high impact gate substantially as hereinbefore  
10 described with reference to the drawings.

Ezi Automation Pty Ltd

By their Patent Attorneys

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PIPER

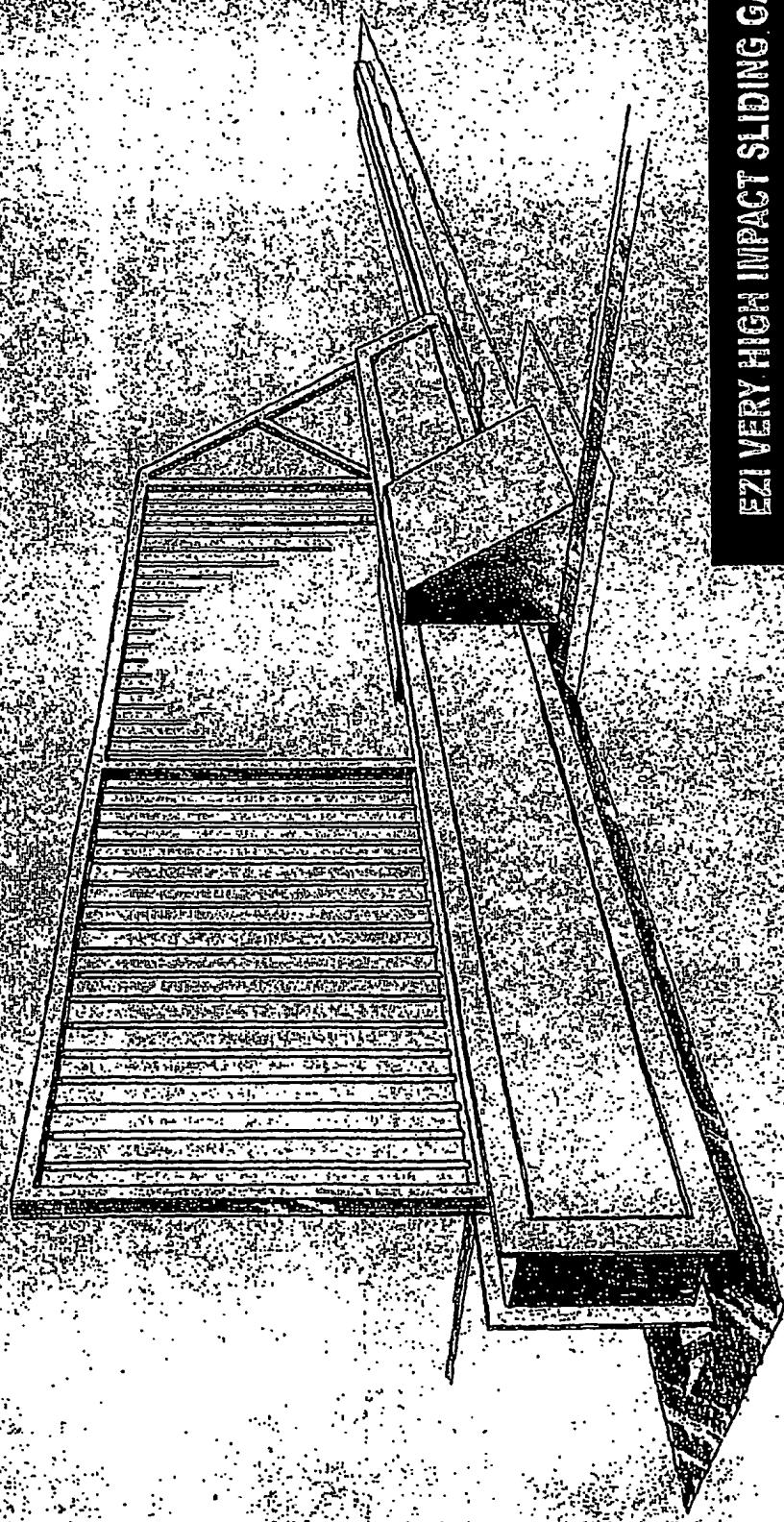
Dated: 11 December 2003

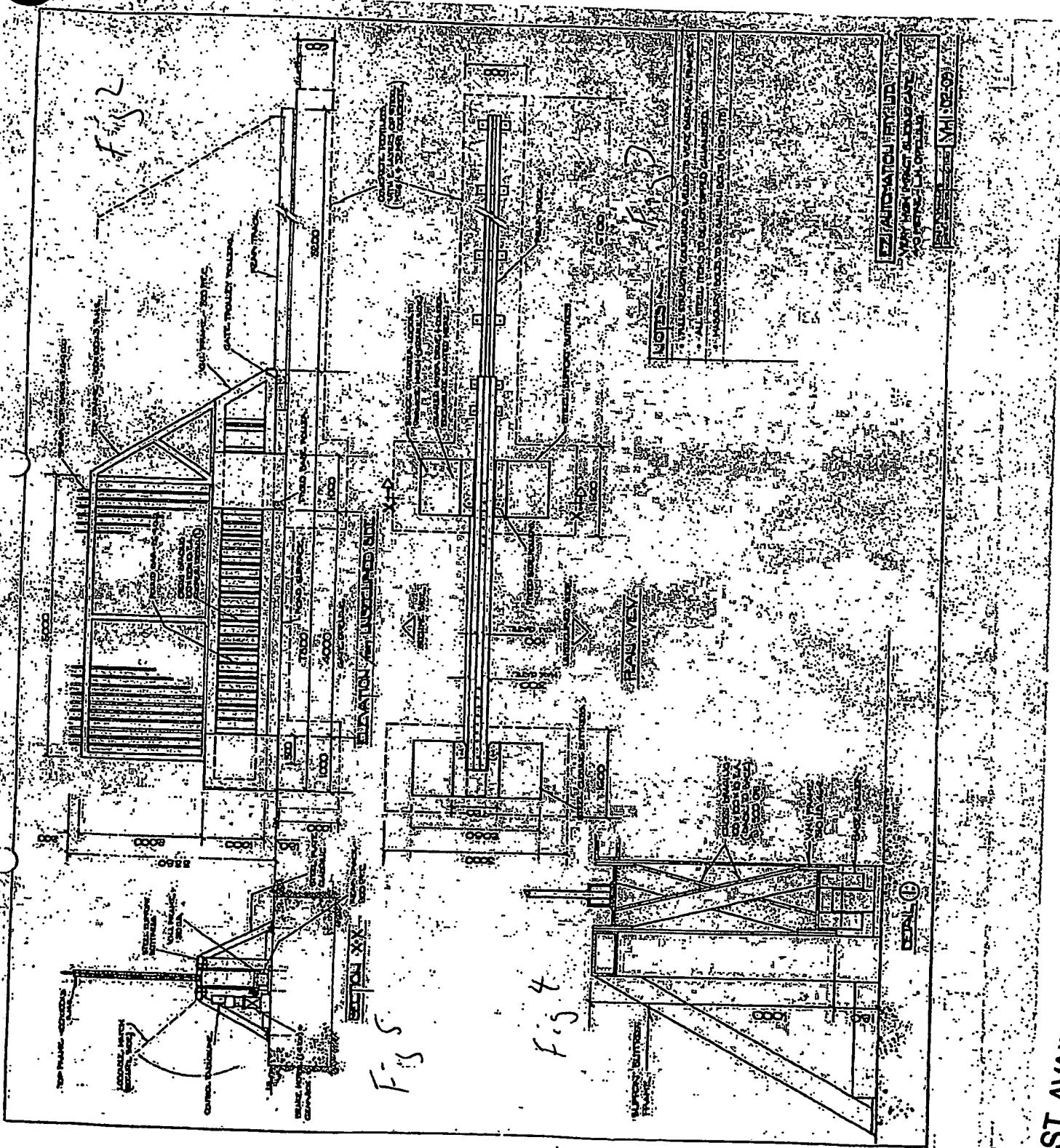
## **ABSTRACT**

In accordance with the invention there is provided a high impact gate including a lower section sized to take the impact of a vehicle, the lower section formed by two spaced linear structures joined by cross bracing to form a high impact barrier. The spaced linear structures can be "I" beams and the bracing can be cross diagonal bracing.

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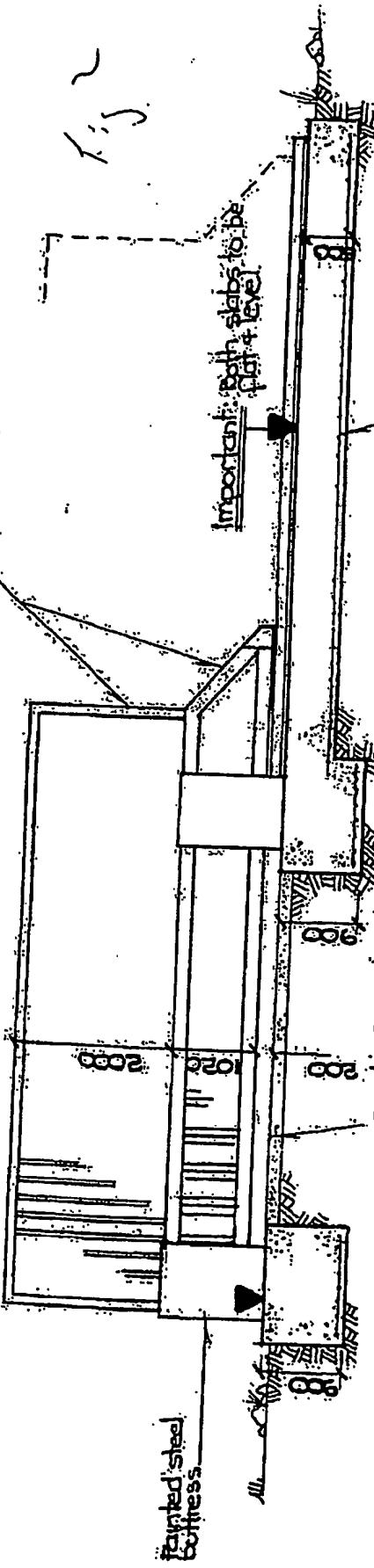
EZI VERY HIGH IMPACT SLIDING GATE





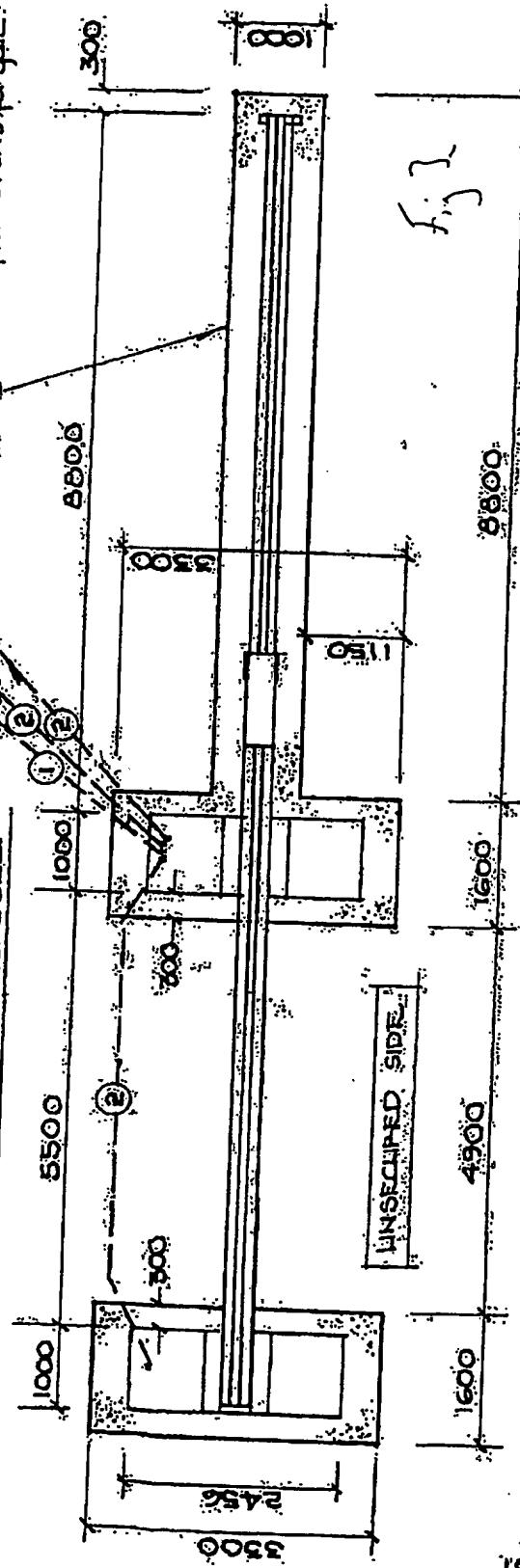
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Structural steel frame



ELEVATION - GATE CLOSED

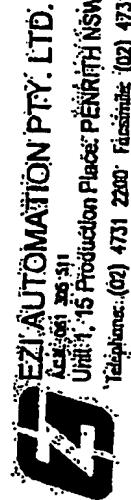
To 3 phase power  
To control location  
Concrete foundations for gate



NOTES  
Conditions

- ① 25 mm. Ording. Min. depth = 500 mm.
- ② 32 mm. White. Min. depth = 300 mm.

Concrete:- FC = 32 M.R. Mesh = 8x12 mm.  
Bot. cover = 75 mm. End cover = 50 mm.



HIGH IMPACT SLIDING GATE  
5.5m OPENING (L. H.)

SCALE	1:50	DATE	29-3-03	DRAWN BY	RAJENDRA PRASAD	DESIGN NO.	HSG-50L-GA	REV.
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